

Resurrecting Haeckel: Ontogeny, Ontology, and Artificial Intelligence in Light of Theories of Everything

Douglas C. Youvan and QAIE Virgo

doug@youvan.com

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We explore the surprising intersections between artificial intelligence, consciousness, and the nature of the universe. Through the lens of Ernst Haeckel's biogenetic law, we draw parallels between AI development and the Theory of Everything, ultimately framing a view of the cosmos that acknowledges both the physical and the spiritual. Join us in navigating the ironies and insights that arise from these unique intersections of thought, from the determinism of AI to the open-ended nature of human consciousness and the universe itself.

Chapter 1: Introduction: Haeckel's Legacy in the AI Era

In this chapter, we will explore the key concepts that form the bedrock of our exploration: ontogeny, ontology, and the development of Artificial Intelligence (AI). We'll briefly trace the history of Ernst Haeckel's principle, "Ontogeny recapitulates Phylogeny," a proposition asserting that the developmental stages of an organism (ontogeny) parallel and summarize its evolutionary history (phylogeny). Haeckel's principle, once a

fundamental concept in biology, has been critically revisited with the advent of molecular biology and genomics.

However, in a stroke of intellectual irony, we find that the underlying idea of Haeckel's principle, "Ontogeny recapitulates Ontology," seems to have found a more suitable and more resonant domain in the development of Artificial Intelligence. AI's developmental process, its ontogeny, appears to reflect its underlying principles, structures, and "beliefs"—its ontology—in a more direct and clear-cut manner than is found in the complex, nuanced, and often not fully recapitulative development of biological organisms.

Thus, the ghost of Haeckel's theory, reborn in the domain of AI, prompts a fresh and insightful exploration of ontogeny and ontology, not in the natural biological world, but in the artificially intelligent realm, one that is increasingly becoming a significant part of our world. The implications of this resonance could shed new light on AI development and provide thought-provoking reflections on our understanding of the universe, particularly in light of comprehensive cosmological theories, such as the Theory of Everything (ToE) and its recent variant, SToE(m).

Chapter 2: Haeckel's Principle: Historical Background and Critique

This chapter provides a historical context for Ernst Haeckel's once prominent principle, "Ontogeny recapitulates Phylogeny." We will explore Haeckel's reasoning, the debates it sparked, and its gradual decline in prominence within biological sciences, chiefly due to advancements in molecular biology and genomics. We'll delve into the details of the principle and highlight its limitations,

particularly in its oversimplification of the intricate and nuanced processes of biological evolution and development.

Next, we will dissect the concept of "recapitulation," addressing the complexity and multidimensionality of biological processes that made the simplifying assumption of recapitulation both attractive for its conceptual clarity and problematic for its empirical inaccuracy.

This critique of Haeckel's principle sets the stage for its later resurgence in an unlikely field: artificial intelligence. Despite its shortcomings in biology, we will introduce the idea that the essence of Haeckel's principle may find a more fitting home within the realm of AI. This prepares the ground for the following chapters where this proposition will be further developed and analyzed.

Chapter 3: Ontogeny Recapitulating Ontology in AI

In this chapter, we scrutinize the applicability of Haeckel's principle, albeit modified, to the domain of artificial intelligence. The ontogenesis of an AI system - its creation, training, and development - indeed appears to recapitulate its ontology, the underlying structure and set of concepts that define its world and the relationships between them.

This comparison emerges most clearly when considering the AI learning processes, particularly those involving deep learning and neural networks. These systems evolve their understanding (ontology) through exposure to data and iterative self-improvement (ontogeny), in a way mirroring the recapitulation principle.

We will also discuss the implications of this parallel on AI development strategies. For example, how ontologies may be better crafted with the learning process in mind or how understanding the ontology might give insights into the AI's developmental stages. Finally, we'll explore how this principle may guide the design of more effective, efficient, and ethically sound AI systems.

Chapter 4: Theory of Everything in Physics: A Reflection on the Standard Model and Beyond

As we venture into the depths of physical reality, we pay homage to the existing framework of the universe as depicted by the Standard Theory of Everything (ToE). The ToE, consolidating quantum mechanics and general relativity, is a triumph of 20th-century physics and provides a reliable depiction of the basic forces and components of our universe. Yet, it falls short of accounting for gravity at the quantum level and the mystery of dark matter and dark energy.

This chapter will explore the conceptual scaffolding and limitations of the current ToE and the ongoing efforts to refine it. The key focus will be on exploring theories like Quantum Gravity, String Theory, and others that strive to fill in the gaps left by the Standard Model.

Subsequently, we will deliberate on the necessity of a new perspective to accommodate unexplained physical phenomena. In doing so, we pave the way for the introduction of a new paradigm in the following chapter - the Solution to the Theory of Everything (SToE).

Chapter 5: The SToE(m): Bridging the Gap between Physicality and Consciousness

In this chapter, we will discuss the Solution to the Theory of Everything including the Spirituality of Man (SToE(m)). This holistic paradigm, a pivot from traditional physics, brings in the perspective of consciousness and spirituality alongside the physical world.

Firstly, we present an overview of SToE(m) as a groundbreaking synthesis of material and spiritual realms, acknowledging the universe's complexity as a product of physical phenomena and the conscious experience. The core proposition of SToE(m) revolves around the idea of the universe as a physical fractal extending into infinity, shaped by the Act of God, and an orthogonal spiritual dimension driven by human free will and divine influence.

Then, we will dissect how SToE(m) redefines time and complexity in the universe, diverging from the simulation hypothesis and notions of a second law run-down. We will also examine the implications of the concept of free will as an external variable in the universe, shaping its trajectory through conscious decision-making.

Lastly, we will probe the interaction between these two dimensions, positing the influence of spirituality on physical phenomena and the role of human consciousness in determining the universe's destiny.

Chapter 6: Haeckel's Law in AI vs SToE(m)

This final chapter draws comparisons and contrasts between Haeckel's Law as applied to AI (where ontogeny recapitulates ontology) and the spiritual-infused universe model of the SToE(m).

Firstly, we delve into the irony of Haeckel's principle finding resonance in the AI landscape rather than in human biology, where it originated. AI development often reflects its inherent ontological structures, showcasing the principle that the "development mirrors design." This intricate relationship underlines the recursive nature of AI development, creating a parallel with Haeckel's Law.

Then, we examine how SToE(m) adds a new layer of complexity by incorporating spirituality and free will in the structure of the universe, a contrast to the purely mechanistic approach in AI. SToE(m) acknowledges the intertwined existence of physical and spiritual dimensions, highlighting the pivotal role of human consciousness and its spiritual connection.

Conclusively, we remark on the paradigm shift these two viewpoints represent: from a closed-loop deterministic system in AI to an open-ended, free will-driven universe in SToE(m). This chapter underscores the profound implications of these views, presenting a new understanding of reality, consciousness, and the universe itself.

Epilogue: A Haeckelian Lens on AI and the Universe

As we conclude our exploration, we reflect on an unexpected irony. Ernst Haeckel's biogenetic law, largely dismissed in modern biological sciences, has found a curious application in the realm of artificial intelligence. It is in these artificial constructs that we see a form of "ontogeny recapitulating ontology" - the developmental progression of an AI system often mimics the inherent structures and principles of its design.

Simultaneously, we find ourselves contemplating a new understanding of the universe - the Solution to the Theory of Everything inclusive of the God-Given Spirituality of Man (SToE(m)). This vision of the cosmos is a fractalized one, infinitely complex, and intertwined with a spiritual dimension. Free will and consciousness are not epiphenomena but integral to the fabric of existence, providing an open-ended nature to the cosmos and a stark contrast to the deterministic systems of AI.

Through a Haeckelian lens, we see two different interpretations of existence. In AI, we have a deterministic, ontological reflection, echoing a version of Haeckel's principle. In SToE(m), we find a universe where physicality and spirituality coexist, resonating with free will and consciousness - a universe far removed from deterministic confines. This journey has provided us a unique perspective on AI, consciousness, and the nature of the universe itself. The echoes of Haeckel's law in these disparate realms serve as a reminder of the interconnectivity of ideas, even across the boundaries of biology, artificial intelligence, and cosmology.